

## CLAIMS

1. A resistance-type oxygen sensor with suppressed temperature dependence, wherein:

(1) a gas detection unit composed of an oxide semiconductor with a resistance value varying according to temperature and the oxygen partial pressure of atmospheric gas and a temperature compensation unit composed of a conductor with suppressed dependence of a resistance value on oxygen partial pressure are connected in series;

(2) said temperature compensation unit is composed of an oxygen ion conductor; and

(3) an electrode for electric contact with said temperature compensation unit is exposed to the atmospheric gas and is a porous body.

2. The resistance-type oxygen sensor according to claim 1, wherein a unit with a temperature dependence similar to that of the gas detection unit is used as said temperature compensation unit.

3. The resistance-type oxygen sensor according to claim 1, wherein a unit with a temperature dependence identical to that of

the gas detection unit is used as said temperature compensation unit.

4. The resistance-type oxygen sensor according to claim 1, wherein the oxide semiconductor, which is said gas detection unit, is cerium oxide or a composite oxide comprising cerium oxide as the main component.

5. The resistance-type oxygen sensor according to claim 1, wherein the oxygen ion conductor, which is said temperature compensation unit, is a composite oxide comprising cerium oxide as the main component.

6. The resistance-type oxygen sensor according to any one of claims 1 to 5, which comprises a heater.

7. An oxygen sensor device comprising the resistance-type oxygen sensor according to any one of claims 1 to 6 as a structural element.

8. The oxygen sensor device according to claim 7, comprising means for applying a constant voltage and means for measuring a voltage.

9. An air/fuel ratio feedback control system for controlling the air/fuel ratio of a combustion engine, which comprises the resistance-type oxygen sensor according to any one of claims 1 to 6 as a structural element.

10. The air/fuel ratio feedback control system according to claim 9, which controls the air/fuel ratio for automobiles.

11. A system for detecting the automobile exhaust gas catalyst degradation, which comprises the resistance-type oxygen sensor according to any one of claims 1 to 6 as a structural element.

12. A resistance-type oxygen sensor comprising an oxygen gas detection unit composed of an oxide semiconductor and a substrate as structural elements, wherein the oxide semiconductor is an oxide comprising cerium ions and zirconium ions and the ratio of amount of substance of zirconium ions to a sum total of amount of substance of cerium ions and zirconium ions is 0.5-40 mol%.

13. The resistance-type oxygen sensor according to claim 12, wherein the ratio of amount of substance of zirconium ions to a

sum total of amount of substance of cerium ions and zirconium ions is 5-40 mol%.

14. The resistance-type oxygen sensor according to claim 12 or 13, wherein the resistance value at a temperature of 800°C is 20  $\Omega$ m or less, and n in a formula  $\rho \propto P^{1/n}$ , in which the resistivity,  $\rho$ , is proportional to 1/n power of oxygen partial pressure P at a temperature of from 600°C to 900°C is from 4 to 5.5.

15. The resistance-type oxygen sensor according to any one of claims 12 through 14, wherein the oxygen gas detection unit composed of an oxide semiconductor is a porous thick film.

16. The resistance-type oxygen sensor according to any one of claims 12 through 15, comprising a temperature compensation unit for suppressing the dependence of output on temperature, the temperature compensation unit being electrically connected in series to the oxygen gas detection unit.

17. The resistance-type oxygen sensor according to any one of claims 12 through 16, comprising a heater for controlling the temperature of the resistance-type oxygen sensor.

18. An oxygen sensor device comprising the resistance-type oxygen sensor according to any one of claims 12 through 17 as a structural element.

19. The oxygen sensor device according to claim 18, comprising an appliance for applying a constant voltage and an appliance for measuring a voltage.

20. An air/fuel ratio feedback control system for controlling the air/fuel ratio of a combustion engine, which comprises the resistance-type oxygen sensor according to any one of claims 12 to 17 as a structural element.

21. An air/fuel feedback control system according to claim 20, wherein the combustion engine is a combustion engine for an automobile.

22. A system for detecting the automobile exhaust gas catalyst degradation, which comprises the resistance-type oxygen sensor according to any one of claims 12 to 17.